

ABSTRACT

The present invention relates to different types of micromirror spectrometers using MEMS (Micro Electro Mechanical Systems) for various applications in the UV, VIS, NIR and MIR wavelength regions. The invention enables a wavelength selection using micro scanning mirror and integrated grating on a much smaller scale than previously encountered conventional diffraction grating monochromators. Especially small designs are obtained via simultaneous usage of collimation optics for both spatial filters, by using entrance and exit slit apertures, which are located very close together. Until now, the spatial filters themselves are not part of the miniaturization. The utilization of the precision from this technology allows for reproducible slits with defined geometries and surface roughness and accurate spatial classification towards the rotation axis of the diffraction grating. Therefore the assembly and adjustment effort of the monochromator is reduced. Due to the option of additional slit apertures, several independent monochromator channels with crossed beam paths can be created; whereas all remaining optical elements (diffraction grating and collimator optic) are utilized together. Such additional channels can serve, for example, as reference measurements of a radiation source, or enable the direct optical control of the grating torsion angle as a monitoring channel. The goal of the invention is to define a simple design and arrangement for monochromators based upon micromechanical elements, which avoids all disadvantages described above.